

## A NEW *GREGGELIX* (MOLLUSCA: PULMONATA: HELMINTHOGLYPTIDAE) FROM BAJA CALIFORNIA SUR, MEXICO

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*Abstract.*—A new species of the pulmonate land snail genus *Greggelix*, *G. punctata*, is described from Baja California Sur, Mexico. Relationships within the genus are discussed.

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The malacofauna of Baja California exhibits sharply distinct regional divisions (Miller, 1973; Christensen, 1979). The south-central, montane, mid-section of the peninsula is relatively inaccessible and malacologically unexplored, but those portions that have been explored show characteristically a typical association of 4 genera of large land snails, namely the bulimulids *Berendtia* Crosse and Fischer, 1869, *Spartocentrum* Dall, 1895, and *Rabdotus* Albers, 1850, and the helminthoglyptid *Greggelix* W. B. Miller, 1972.

In July 1971, while examining specimens of *Greggelix* in the collection of the U.S. National Museum, I noticed one lot (USNM 190288) of 6 shells labelled “*Sonorella*” *loehri*, whose sculpture was radically different from that of typical *loehri*. Instead of the usual dense granulations of *G. loehri*, the sculpture consisted of regularly spaced, punctate papillae arranged in parallel, descending rows. The lot had been collected by Nelson and Goldman on 30 October 1905, and the locality was listed as “Guajadanni,” which is currently spelled Guajademi. This lot indicated that yet another undescribed species of *Greggelix* might inhabit the mid-section of the Sierra de la Giganta.

Accordingly, in October 1972, my graduate students Carl C. Christensen, Peter N. D’Eliscu, David B. Richman, and Richard L. Reeder, and I, accompanied by a visiting Belgian entomologist, Charles Gaspar, set out to explore the mid-section of the Sierra de la Giganta immediately west of Mulege. We drove westerly on winding desert roads along the Rio Mulege Valley, past a ranch named El Potrero, until we came to the end of the road at the foot of the escarpment which forms the east wall of the Sierra de la Giganta. A small ranch, located there, is aptly named Pie de la Cueta. From there, a trail led over the mountains to the Guajademi ranch, on the Pacific side of the range, about 5 kilometers from Pie de la Cueta.

We explored several rockslides along the trail, on the Gulf slope as well as on the Pacific slope, and we found the typical associations of the 4 genera of large land snails mentioned above. The bulimulid species were the well-

known *Berendtia taylori* (Pfeiffer, 1861). *Rabdotus lamellifer* (Pilsbry, 1897), and *Spartocentrum irregulare* (Gabb, 1868); the helminthoglyptid *Greggelix*, however, turned out to have the same sculpture as the USNM lot No. 190288 and to be a new species, which is described below. The following abbreviations for repositories of materials are employed: ANSP—Academy of Natural Sciences of Philadelphia; CAS—California Academy of Sciences; CCC—personal collection of Carl C. Christensen; FMNH—Field Museum of Natural History; RLR—personal collection of Richard L. Reeder; USNM—National Museum of Natural History; UTEP—University of Texas at El Paso; WBM—personal collection of Walter B. Miller.

*Greggelix punctata*, new species

Figs. 1A–C, 2A, 3A, B

*Description of shell holotype.*—Shell strongly depressed, with a flat spire, wide umbilicus, and broadly flaring peristome; color light-brown, with typical narrow, dark-brown band above periphery. Embryonic shell of  $1\frac{1}{2}$  whorls sculptured from the beginning with light, radial wrinkles superimposed with scattered papillae. Postembryonic whorls with light growth wrinkles, superimposed with evenly spaced, punctate papillae, arranged in gradually descending parallel rows; this sculpture persists on the body whorl, below the periphery and into the umbilicus. The aperture is round, with margins converging to the thin parietal callus, and the peristome is strongly reflected; the columellar margin is slightly reflected over the umbilicus. Diameter 20.7 mm, height 10.8 mm, umbilicus width 3.7 mm, number of whorls  $4\frac{1}{4}$ .

*Anatomy.*—The anatomy is typically that of *Greggelix* as described by Miller (1972). In the reproductive system there is a short, bulbous, somewhat spherical verge in the short saccular penis. The epiphallic caecum and the spermathecal diverticulum are exceptionally long. In the 6 specimens examined, there is no dart apparatus and no vestige of any mucus glands. The body wall of the extended animal is light gray, and the mantle collar secretes a bright chartreuse-colored mucus; the edge and the back of the foot are also chartreuse.

*Variations in the shells of the paratypes.*—There is remarkably little variation in shell measurements in over 40 specimens in the type lot; the largest shell measures 22.7 mm in diameter while the smallest measures 19.2 mm. All have a very flat spire, broadly flaring aperture, and the distinctive sculpture of evenly spaced, punctate papillae arranged in gradually descending parallel rows.

*Disposition of types.*—Holotype: USNM 792140; Paratypes: USNM 792141; ANSP 353390; CAS 018890; FMNH 199000; UTEP 8276; CCC 2951; RLR 0191; WBM 5998.

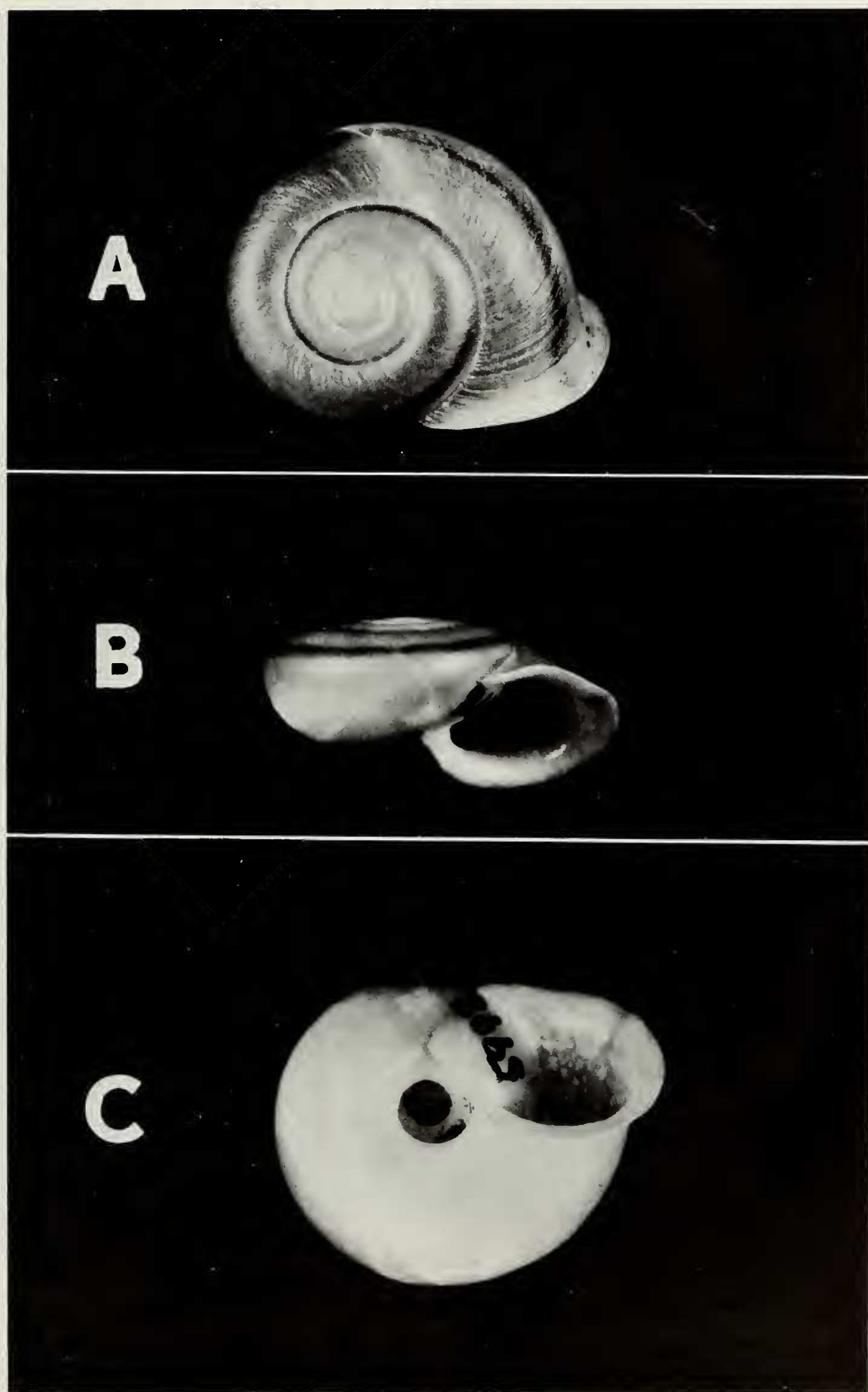


Fig. 1. Holotype of *Greggelix punctata*, USNM 792149: A, Dorsal view; B, Side view; C, Umbilical view. Maximum diameter 20.7 mm.

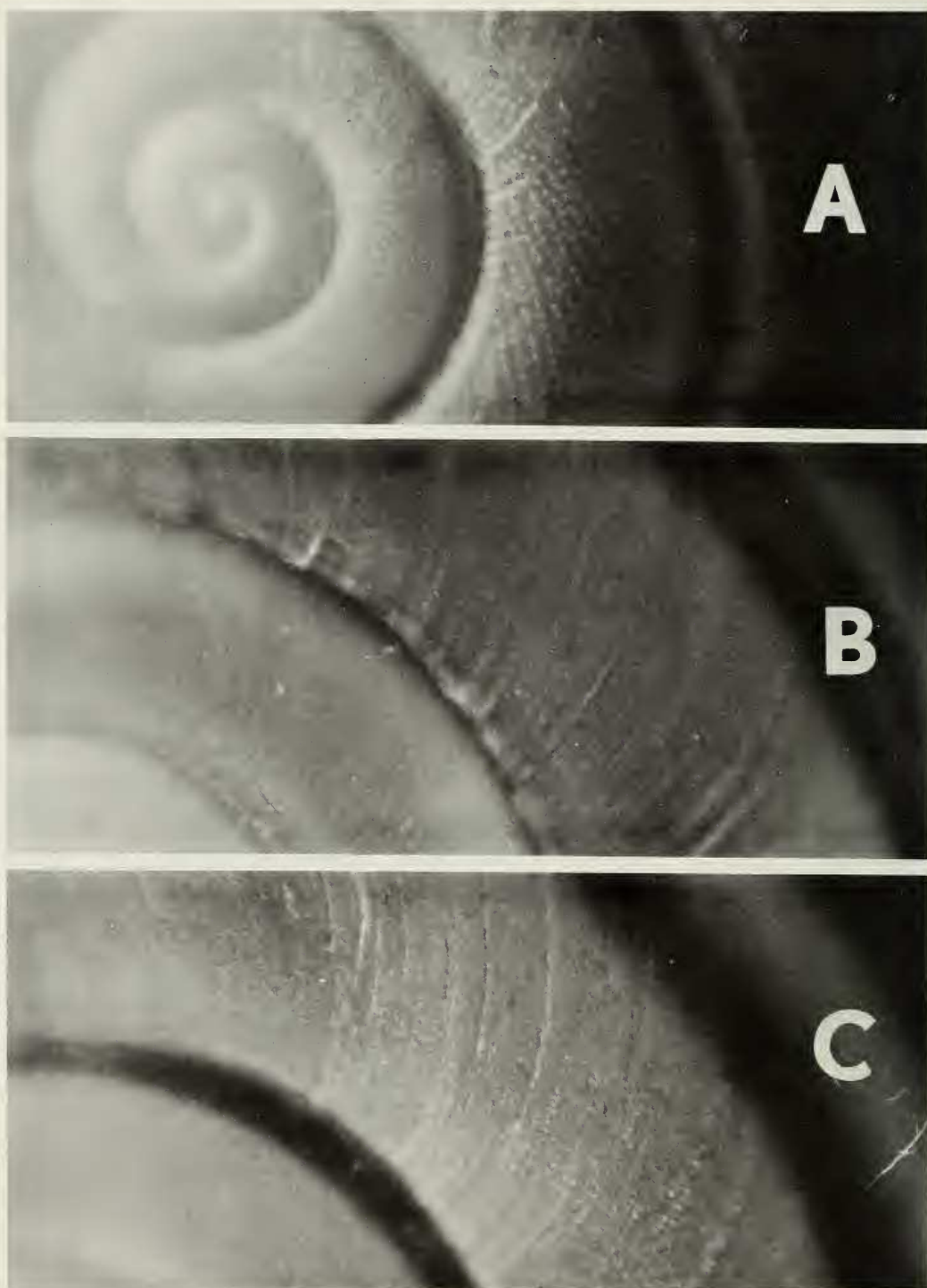


Fig. 2. Shell sculpture of *Greggelix*. A, *Greggelix punctata*, 10 $\times$  ; B, *Greggelix indigena*, 12 $\times$ ; C, *Greggelix loehri*, 12 $\times$ .

*Type-locality*.—Baja California Sur, Mexico. Gulf slope of Sierra de la Giganta, SW of Mulege, along trail from Pie de la Cueta (2.9 miles S of El Potrero) to Guajademi, in rock-slide along trail about 1½ miles from Pie de la Cueta (or about ¾ mile from trail summit) at ca. 2450 ft. elevation.



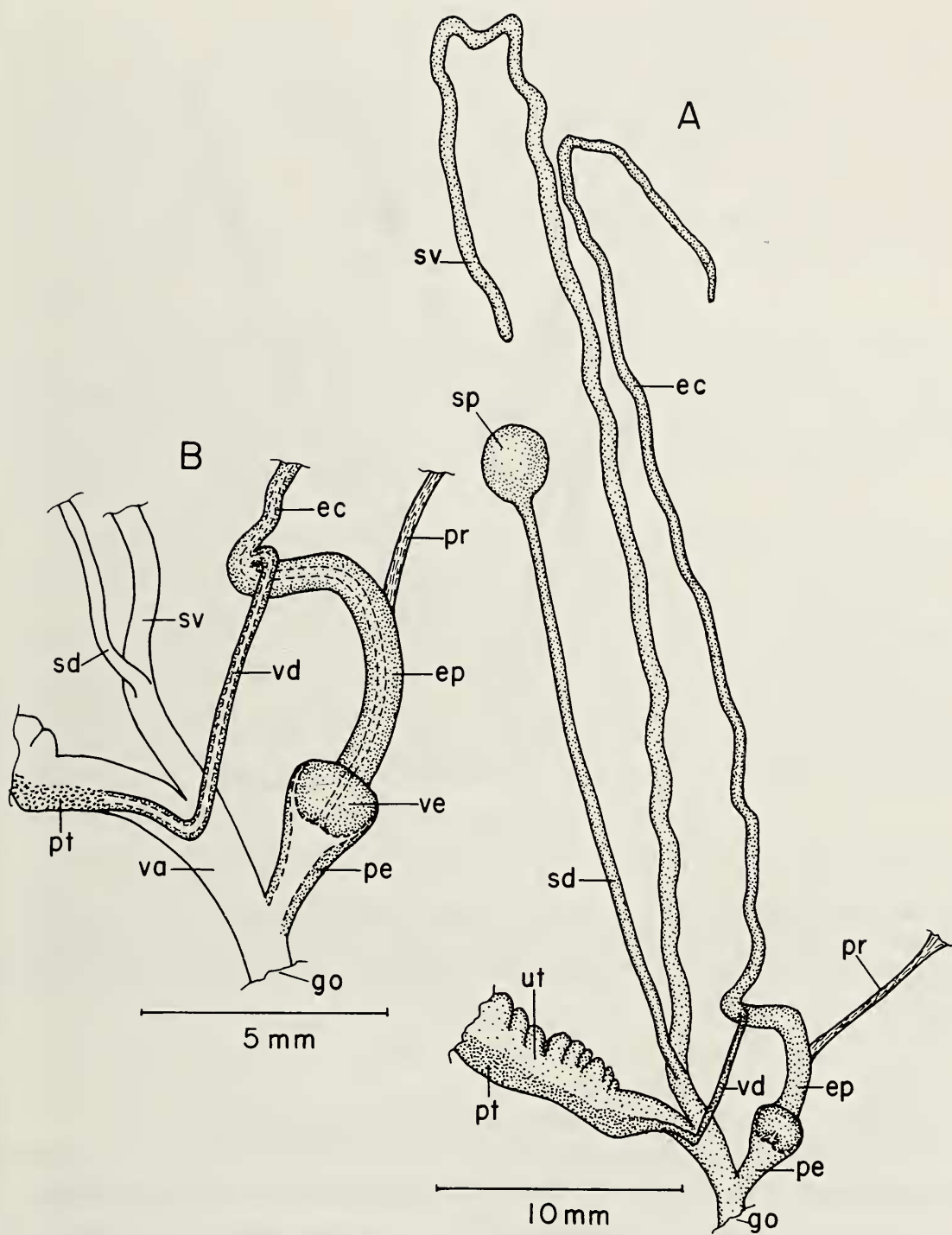


Fig. 3. A. Distal reproductive structures of *Greggelix punctata*; B. Details of distal male reproductive structures of *G. punctata*, showing internal arrangement as seen in transparency. All structures to scale as indicated, projected from permanent whole mount; ec, epiphallic caecum; ep, epiphallus; go, genital orifice; pe, penis; pr, penial retractor; pt, prostate; sd, spermathecal duct; sp, spermatheca; sv, spermathecal diverticulum; ut, uterus; va, vagina; vd, vas deferens; ve, verge.

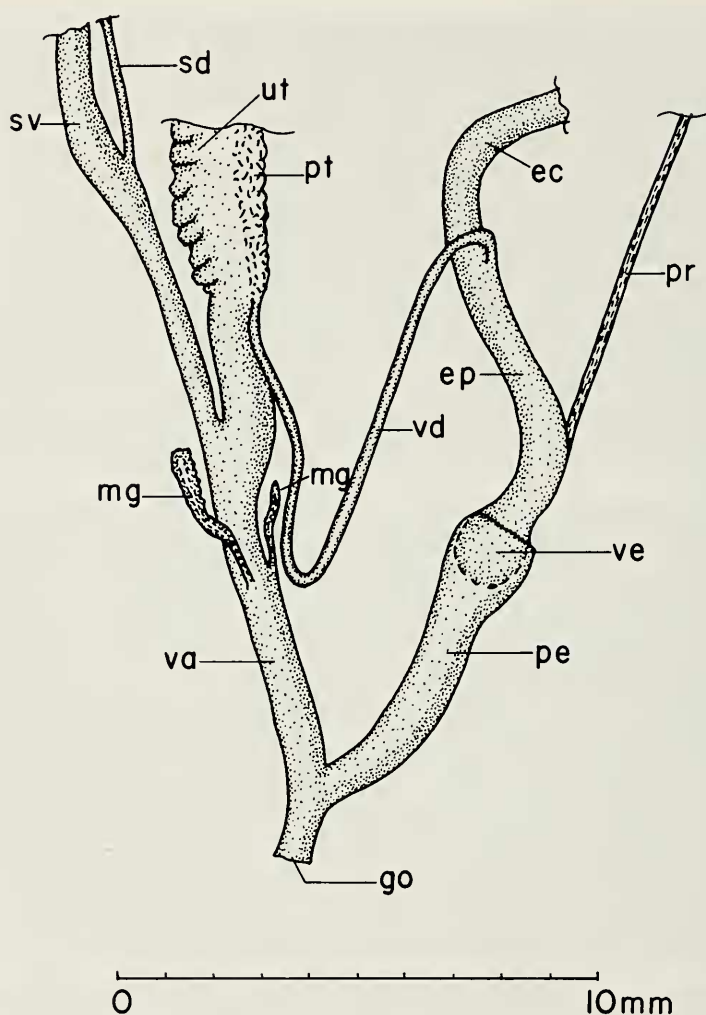


Fig. 4. Distal reproductive structures of *Greggelix loehri*, WBM 6002, showing two rudimentary mucus glands (mg) inserted on the vagina. Verge (ve) shown as seen in transparency. All structures to scale as indicated, projected from permanent whole mount; abbreviations as in Fig. 3.

*Etymology*.—Named for the distinctive punctate papillae.

*Distribution*.—*Greggelix punctata* has been found only at 3 localities along the trail from Pie de la Cueta to Guajademi, namely the type-locality, a second locality only 1.0 mile from Pie de la Cueta, and a third locality on the Pacific slope of the Sierra de la Giganta about  $\frac{3}{4}$  mile beyond the trail summit, in the vicinity of Guajademi. It undoubtedly occurs in other rock-slides in the general area SW of Mulege, but it does not occur far to the south, in the area around San Javier where it is replaced by *Greggelix loehri* (Gabb, 1868), nor far southwesterly, in the areas of La Purisima and San Jose de Comondu where it is replaced by *G. indigena* (Mabille, 1895). Northwest of Mulege, in the vicinity of San Jose de Magdalena, it is again replaced by *G. indigena*.

*Discussion.*—*Greggelix punctata* can be instantly distinguished from the other 2 described species of *Greggelix*, namely *G. loehri* and *G. indigena*, by its shell sculpture of regularly, evenly spaced, punctate papillae arranged in gradually descending parallel rows over the entire shell; on fresh, juvenile shells, the papillae are tipped with hair-like periostracal projections. In *G. indigena* (Fig. 2B) occasional papillae can be found on the first 2 or 3 whorls, but they are totally absent from the body whorl; some specimens occasionally show faint traces of spiral grooves on the upper surface of the body whorl.

In *G. loehri* (Fig. 2C), the shell surface is thickly granulose; in typical *G. loehri*, the granulose sculpture is concentrated on the raised growth lines; in other specimens, the granulose sculpture is continuous over the entire surface and completely obliterates the underlying growth lines. Jules Mabilie named the completely granulose shells *Helix steganella* Mabilie, 1895, and *Helix invecta* Mabilie, 1895.

In my article (Miller, 1972) describing the genus *Greggelix*, I stated that although I had examined the types of *H. steganella*, *H. invecta*, and *H. loehri*, I had been unable to find any typical specimens of *H. loehri* in a sample of shells from San Javier sent to me by Charlotte Church. Subsequently, I collected large numbers of additional shells from San Javier and I found completely intergrading forms from typical *loehri* to typical *invecta* and *steganella*, in the same population. I can now concur, without reservations, with Pilsbry (1916) and Hanna and Smith (1968) that Mabilie's names *invecta* and *steganella* are synonyms of *loehri*.

Concerning the reproductive anatomies of all described species of *Greggelix*, I can find no consistently different, distinguishing characters that would serve for diagnosis among the species. All have similar verges, epiphallic caeca, spermathecal diverticula, etc. There are variations in the lengths of the penis and the vagina in *G. loehri*, *G. indigena*, and *G. punctata*, but the number of live adults has been too low to permit statistically convincing findings. In *G. loehri*, however, all of 7 specimens examined did have minute, rudimentary mucus glands inserted directly on the vagina (Fig. 4); 2 of the specimens had 2 such glands each, while the other 5 specimens had only one gland each. No such glands have been found in any of 8 *G. punctata* specimens examined nor in any of 8 *G. indigena* specimens. Statistically, it is not yet possible to state conclusively that all *G. loehri* specimens can be expected to have mucus glands, nor can it be said with certainty that no *G. punctata* nor *G. indigena* specimens have such glands. The presence of rudimentary mucus glands in *G. loehri* appears to be evidence that the gene, or genes, for these structures have not been completely eliminated or repressed from the genome. It is presumed that the absence of a dart sac in *Greggelix*, as well as the absence of mucus glands in *G. punctata* and *G. indigena* evolved as secondary simplifications from a fully equipped helminthoglyptid ancestor.

### Acknowledgments

I am grateful to my friends and colleagues Carl C. Christensen, Charles Gaspar, Peter N. D'Eliscu, David Richman, and Richard L. Reeder for their support, encouragement, and assistance in the discovery and collection of large numbers of specimens of this new species.

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